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Linking Development, Trade, and Debt Strategies in Highly Indebted Countries

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As world interest rates and the level of external debt rise and terms of trade decline, a policy of import substitution begins to make sense for a highly indebted country. At that point, it is in the creditor's interests to grant some debt relief in exchange for a higher export effort.

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Despite their productive inefficiencies, export promotion and import substitution policies can improve welfare in a highly indebted country.

After all, the ultimate penalty facing defaulting countries is exclusion from international trade markets. Export promotion can increase available foreign financing, and import substitution can reduce the debt service.

Choosing between export promotion and import substitution is a matter of determining whether it is more profitable to increase the credit ceiling to borrow more — or to reduce the credit ceiling below inherited debt so there is less to repay.

Important determinants in this choice are the stock of inherited foreign debt, the level of world interest rates, the terms of trade, and the availability of profitable investment opportunities.

Generally, a policy of export promotion is best if the level of debt and interest rates are low and the terms of trade are high.

As these variables deteriorate — as a Korea becomes a Peru — the optimal strategy becomes import substitution. In those circumstances, it is in the creditor's interests to grant some debt relief in exchange for a higher export effort.

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by

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I. Introduction

The realization of a series of negative shocks in the international economy has seriously affected the perceived credit-worthiness of a number of LDCs. As a result, new loans have dried up and the debt crisis has locked creditor groups (commercial banks as well as bilateral lenders) and many HICs in a tough bargaining situation over the amounts of debt repayment and over the required adjustments in their economies that are needed to make those transfers feasible. This has re-opened the debate on the relative merits of export led and of import substitution led growth. The purpose of this paper is to investigate the links between a country's growth and debt strategies and to contrast optimal growth strategies before and after a debt crisis.

For a debtor country to service a large external debt, large current account surpluses are needed. But besides this simple identity, a more subtle link between trade and debt strategies arises from the fact that the gains from trade serve in effect as a collateral on a country's foreign debt¹. Over time, this collateral is affected by trade policy and by the sectoral distribution of investment. If a country is trying to regain or increase its credit-

¹ This approach is taken in Gersovitz (1984), Diwan and Donnenfeld (1986), Boenizstein and Gosh (1988) and Aizenman (1987).

worthiness, an export promotion strategy (EP) helps because it is bound to increase the gains from trade and therefore, the value of the collateral. On the other hand, a country that is trying to minimize its debt repayments can do so by reducing its trade, i.e by pursuing an import substitution (IS) led growth strategy. By reducing the value of its collateral, the country reduces its debt repayment, albeit at the cost of a cut-off of new loans.

The purpose of this paper is to analyze the determinants of the choice by debtor countries of a jointly optimal trade and debt strategy after the occurrence of some negative shocks. We find that the optimal response involves attempts to increase credit-worthiness and thus an EP strategy, when the shocks are not too large and when profitable investment opportunities would be forgone in the absence of new loans. On the other hand, large negative shocks coupled with poor investment opportunities can lead to an optimal strategy of withdrawal from international markets with an IS emphasis. Moreover, interest rate and terms of trade shocks can lead to a sudden shift in the optimal growth strategy.

For the creditors and for the creditor governments, an IS strategy by the debtor is sub-optimal. We show that the optimal response to an IS strategy involves debt write-offs that are intended to provide the debtor with the incentives to regain its credit-worthiness.

The analysis is cast in terms of credit ceilings and their dependance on exogenous variables as well as on variables that are controlled by the debtor. The expected present value of the maximal

net transfers that a country is willing to effect in the future in order to escape sanctions represents a ceiling that rational lenders try not to exceed in order to earn profitable returns on their loans. While the threatened penalties are hard to ascertain, mainly because they are seldom used given the superiority of recontracting, it is widely recognized that in most cases, sanctions will involve the exclusion from some international trade markets². The realization of a series of negative shocks (interest rate increase, terms of trade deterioration, slow-down of growth in the industrial world) seems to have raised the size of many countries foreign liabilities above that ceiling (explaining why debt trades at a discount in the secondary markets). Debtor countries have reacted to the financial crunch by improving their current account balances. But as Table 1 shows, some countries have adjusted by expanding both imports and exports i.e by increasing their participation in international trade while others chose to adjust with a sharp contraction in imports, with little increase or even a decrease in exports, i.e by reducing their participation in trade. In this paper, we explain those different responses to the shocks of the early eighties as rational policy choices that attempt to either regain credit-worthiness or to reduce the debt burden. We then explore the determinants of this choice.

The notion that economic policy could be used to affect the debt strategy is not new. A sizable literature has analyzed the incentives for under-investment in terms of a "Debt Laffer Curve".³ Other papers

² For a good discussion, see Kaletsky (1985).

³ Sachs (1988), Krugman (1987), Froot and Al (1988), Corden (1988)

have studied the benefit of a pre-committment to no-default policies in a trade context⁴. This paper is about the determinants of the optimal choice between those two types of (mutually inconsistent) strategies. Moreover, the paper develops the debt overhang argument in a trade context. Thus, a central result of this paper is that in the absence of an optimal sectoral investment strategy (or of a resolution of the debt crisis), investment will be inefficiently allocated between the two sectors. A country can be made better off by either subsidizing the export sector in order to increase the amount of new borrowings or by subsidizing the IS sector in order to reduce its debt repayment. This has important implications both for the understanding of policy choices in the indebted countries as well as for the formulation of solutions to the debt crisis.

The paper is organized as follows: In section II, a simple two periods trade model under certainty is set-up. Section III analyzes the joint optimal debt and investment strategies. Section IV discusses extensions. Section V discusses the welfare concerns and section V concludes.

II. A two periods model under certainty.

II.1 The analytical set up.

The simplest set-up needed to deal with the problem at hand is a two periods, two goods model of a small productive economy populated

⁴ See Gersovitz (1984), Diwan and Donnenfeld (1986), Aizenman (1987), Borensztein and Gosh (1988).

by a representative agent with an inherited international liability. The focus is on the investment decision that allocates some amount of capital⁵ K between the two productive sectors in the first period $t=1$. Foreign borrowing also takes place at $t=1$ and consumption, trade and debt repayment takes place in the second period $t=2$. Presumably, there is a government in charge of foreign borrowing and repayment decisions.

Denote the exportable good by x and the importable one by m ; (X,M) represent domestic output while (x,m) denote the consumption vector. The international prices are given by $(p,1)$, with the importable price normalized to unity. If no trade occurs, the domestic price of the exportable is given by p^A ⁶. We assume through-out that $p^A < p$, i.e that if international trade occurs, x is indeed exported and m is imported.

The productive structure is given by two neo-classical concave production functions that use capital as the only input:

- (1) $X=f(K_x)=f(aK)$ with $f'>0$ and $f''<0$
- (2) $M=g(K_m)=g((1-a)K)$ with $g'>0$ and $g''<0$
- (3) $K=K_x+K_m=K_D+D_1$

where K is the total invested capital, K_D is an exogenously given amount of domestic saving, D_1 is borrowed in $t=1$, and (a) is the

⁵ For simplicity, savings are held constant. Thus, we do not incorporate debt overhang considerations. Instead, the focus is on the allocation of investment between the two sectors. The case with endogenous savings is discussed in section IV.1.

⁶ In this setting, this is a marginal rate of substitution between the two goods rather than a market price.

proportion of total capital invested in the export industry. The representative agent's preferences for consumption are given by a concave utility function $U(x,m)$. We also make use of the expenditure function $E(U,p)$ (that determines the smallest income that can achieve a utility level U at prices p) and of the indirect utility function $V(I,p)$ that determines the maximum utility level achievable with an income of I and prices p . I the country's income evaluated at world prices :

$$(4) \quad I = pX + M$$

II.2 The repayment decision.

Denote by D_0 the country's foreign liability at the beginning of period $t=1$, by D_1 the amount of new money borrowed in $t=1$ and by D_2 the country's total liability at the end of $t=2$ respectively. For simplicity, we assume that all loans are due at the end of $t=2$ and that all loans carry an interest rate of $(R-1)$. Thus we have:

$$(5) \quad D_2 = (D_0 + D_1)R$$

We now analyze the repayment decision at time $t=2$ and we later discuss the borrowing decision in $t=1$. Assume that the repayment decision is made by a central planner that aims at maximizing the representative agent utility in $t=2$. Instead of examining cases of insolvency, we will instead concentrate the analysis on the more relevant issue of the willingness to pay. Thus, assume that the

planner has the option of repaying the full amount due D_2 or of bargaining with the country's creditors for a repayment of B . Since renegotiating is an option of the planner, the option will be exercised only when $B < D_2$. Thus, the implicit form of the debt contract is given by a repayment function R of the form:

$$(6) R = \min[B, D_2]$$

In general B depends on the threat points and the bargaining power of both the debtor and its creditors⁷. The debtor can threaten to default completely on the loans. The creditors can threaten to impose various sanctions. We will assume here that those sanctions are trade related, and for analytical tractability, we take the sanction to be a cut-off of the defaulting debtor from some international trade markets. If the threat is credible, a debtor country will have to consume its autarkic allocation (X, M) in the event of a default. If D_2 is large enough, a debtor may still prefer to default and lose its trade option rather than to repay fully its international debts. But such a resolution is ex-post inefficient since the potential gains from trade are then lost. Both sides of the contract can end up better off with a bargain. Thus, it is natural to assume that the debt contract will be renegotiated and that sanctions will not be imposed. The outcome of this is a repayment of B .

If creditors do not gain (or lose) from the sanctions, they would accept any positive repayment in exchange for a lifting of the trade

⁷ A discussion of the bargaining process is in Bulow and Rogoff (1986).

sanctions. On the other hand, the upper bound of the transfer that a debtor is willing to make to avoid sanctions, B^U , is given by the amount of repayment that leaves him indifferent between (i) repaying that amount and engaging in international trade (the trade mode) and (ii) defaulting and consuming his own product (the autarkic mode). In effect, the upper bound B^U represents the valuation by the debtor of his gains from trade, or alternatively, the amount of resources that the debtor is willing to give out in order to retain his option to trade in the international goods markets. Formally:

$$(7) \quad B^U(K, a, p) = I - E[U(X, Y), p]$$

where $U(X, Y)$ is the autarkic utility level and $E[U(X, Y), p]$ is the expenditure needed to achieve that utility level in the trade mode. Thus, $I - E[.]$ is the maximum income that is given out to retain the trade option.

The relationship in (7) is depicted in figure 1 in the two goods space. The available stock of investable funds K and the production functions determine the production possibility curve FF . The investment mix (a) determine the production vector depicted as P . The indifference curve AA that passes through P represents the autarkic level of utility given K and a . The maximum repayment B^U that the country is willing to make in order to preserve its trade option leaves the country on the indifference curve AA but allows it to consume the vector C . The distance between the budget lines (at prices p) that go through P and C determine B^U .

We generally expect that B is bounded below by zero and above by B^U , the debtor's gains from trade, with the exact amount determined by bargaining. However and for simplicity, we take $B(K,a,p) = B^U(K,a,p)$. This assumes that the creditors coalition is in a monopoly situation in the sense that it can extract all the borrower's surplus.⁸ Finally, note that although B is the repayment that leaves the country indifferent between defaulting (and not trading) and repaying (and trading), when such a choice is available, we will assume that the country prefers to repay B and to trade rather than to default and not trade⁹.

[figure 1]

II.3 Credit ceiling.

In $t=1$, competitive creditors are willing to advance a loan D_1 if they expect to earn with certainty a return equal to their cost of capital R^F ¹⁰. Assume that the country can commit itself to some investment mix (a) before the lenders make a loan and that all the investable capital K has to be invested after the new loan is made¹¹. Moreover, assume for now that the inherited debt D_0 is zero. For a large enough loan, the contractual repayment $D_1 R^F$ can get larger than

⁸ A discussion of the more general case with bargaining is in section IV.2. The results are essentially similar.

⁹ This does not entail any loss of generality since the country can be made to strictly prefer the trade regime if it is required to repay $(B-\epsilon)$ with $\epsilon > 0$ and infinitely small.

¹⁰ This is due to certainty. With uncertainty, risk neutral and competitive lenders advance new loans when the expected return on the loans is at least equal to their cost of capital. The effect of uncertainty on the model is discussed in IV.4.

¹¹ The possibility of precommitting the investment mix and the time inconsistency problems are discussed in IV.3.

the gains from trade $B(D_1+K, a, p)$ that represent the largest repayment a country will be willing to make. In that case, the creditors can rationally expect the debtor to renegotiate his loan in the future in order to limit his repayment to his gains from trade $B(\cdot)$ and the loan will not be profitable.

What is the maximum amount of capital that the creditors can safely lend in $t=1$? First, we note that this is a positive amount since the gains from trade are always positive. With no inherited debt, the largest safe loan D^{MAX} is then given by the loan size that makes the debtor indifferent between repaying its gains from trade $B(D^{\text{MAX}}+K, a, p)$ and the contractual repayment $R^F D^{\text{MAX}}$. Thus, the credit ceiling in $t=1$ solves:

$$(8) \quad D^{\text{MAX}}(a, p) = B^{\text{MAX}}(a, p) / R^F = B(K^D + D^{\text{MAX}}, a, p) / R^F$$

This is illustrated in figure 2 that depicts the shape of the gains from trade function B in relation to the size of the loan D^{12} . For D below D^{MAX} , the loan is safe since the gains from trade exceed the required repayment DR^F . However, above D^{MAX} , the country will repay its gains from trade B that are below the required DR^F .

Note that the credit ceiling is large when the gains from trade are large. Intuitively, this is because large gains from trade are valuable to the debtor and thus, he will be willing to effect large transfers as debt service in order to protect his option to trade in

¹² $B(D)$ is generally concave because of the concavity of the production function. See the appendix for a discussion.

the international goods markets. On the other hand, a country that is less dependent on trade is less dependable; it will pay less to be able to trade and its credit ceiling will be low.

[figure 2]

II.4 New borrowings.

With some inherited debt, we assume that the new loan will be repaid according to the contractual schedule only when the inherited debt is also repaid fully¹³. Thus, a new loan can be profitably advanced only if the inherited debt D_0 is below the credit ceiling D^{MAX} . Moreover, the maximal amount of net lending in $t=1$, we call it from now on D_1^{MAX} , is dependant on the amount of inherited loans D_0 . We have:

$$(9) \quad D_1 < D_1^{\text{MAX}} = \text{Max} (D^{\text{MAX}} - D_0, 0)$$

It can be shown (see appendix for the proof) that:

Proposition 1:

D^{MAX} is increasing in p and in K^D and decreasing in R^F .

Intuitively, an increase in the terms of trade p increases the gains from trade and thus, the amount that the debtor is willing to

¹³ That is, we are assuming that new loans are not senior to the old loans.

pay in order to retain the trade option. Moreover, when discounted at a higher interest rate R^F , the maximum repayment B^{MAX} translates into a lower credit ceiling. Finally, an increase in domestic savings expands investment, trade and thus, it increases the gains from trade.

We define a situation in which the inherited debt is above the credit ceiling as a debt overhang.¹⁴ In a debt overhang, no new lending is forthcoming and there is partial default on inherited debt. On the other hand, credit-worthy countries that can get new loans are expected to fully repay their debts according to schedule.

II.5 Decentralized investment.

The investment decision is taken in $t=1$. There are two aspects to it: the amount of the investable capital K (which depends on the amount of the new loans, if any) and the allocation of K between the two productive sectors. In this section, assume that the sectoral allocation is arbitrated by a credit market that is free of government distortions. If the government borrows abroad, it must distribute the new loans to the private sector through a market mechanism and the gains (or losses) are passed to the consumers in $t=2$ in the form of a subsidy (or a tax). In such an economy, the sectoral allocation of capital is determined by profit maximization and is independent of the debt strategy. In equilibrium, and for every level of investable

¹⁴ In a world of uncertainty, the credit ceiling is given by the discounted expected maximum repayments. Thus, it will depend on the whole probability distributions of p and R^F . The realization of low terms of trade and high interest rates in the early eighties must have lowered that ceiling. Later, we use this interpretation to argue that in many instances, the stock of inherited debt does indeed exceed the credit ceiling.

capital K , the optimal free trade investment mix a^F maximizes income I and is given by the usual marginal condition:

$$(10) \quad pf'[a^F K] = g'[(1-a^F)K]$$

where $(')$ denotes derivatives with respect to K . This, together with K determine the optimal free trade production vector (X^F, M^F) as well as the free trade credit ceiling $D^{MAX}(a^F, p)$. Moreover, it is easy to show that a^F and X^F increase in p while M^F decreases in p .

III. Optimal intervention.

Would a central planner choose the investment mix a^F ? In our setting this is not always the case. Of course, any deviations from that rule will reduce income if new borrowing and debt repayment are kept constant. However, the choice of an investment mix can have an important impact on both the availability of new lending as well as on the amount of debt repayment because it affects the gains from trade. Sometimes, these externalities are large enough to offset the productive efficiency loss of intervention.

For example, very profitable investment opportunities are available but cannot be undertaken because of a lack of capital. In this case, it might be welfare improving to shift the investment mix towards the export sector if this increased the credit ceiling. The loss in productive efficiency would be more than compensated by an increase in the scale of production. Alternatively, if the burden of

inherited debt is quite heavy and profitable projects are scarce, it might be profitable to shift the investment mix towards the IS sector in order to reduce the country's reliance on trade and the debt burden. The saving in debt service might more than offset the loss in productive efficiency

In this section, we analyze the planner's joint optimal debt and investment strategies and discuss the factors that affect the interactions between these two concerns. When the optimal investment mix is different from the decentralized one, trade policy is welfare improving. It is important to note that in a decentralized economy, a departure from a^F cannot be achieved by an exchange rate policy but rather with subsidies to the export sector and with taxes on the import competing sector¹⁵.

III.1 Trade policy, repayment and credit ceiling.

It can be shown (see the appendix) that the gains from trade function $B(K,a,p)$ as well as the credit ceiling $D^{\text{MAX}}(a,p)$ are well defined functions that increases in (a) , the proportion of capital invested in the export sector in the range $[a_F, 1]$. The intuition is simple: as more gets invested in the export sector, the country will increase its gains from trade (but at a decreasing rate).

The debt repayment and the credit ceiling are minimized with the choice of an investment mix a^A that minimizes the gains from trade. This is achieved with a production mix that is as desirable for

¹⁵ This can take the form of differential income taxes, of different interest rates charged on loans by government agencies, or of trade related taxes.

autarkic consumption purposes as the preferred trade allocation. Using equations (7) and (8), it is possible to show that there exist a mix a^A that reduces the debt repayment and the gains from trade to zero. This investment mix that determines the most extreme form of IS strategy that the debtor country could follow is given, at every level of available capital K , by:

$$(11) \quad p^A = U_x[f(a^A K), g(1-a^A)K] / U_m[f(a^A K), g(1-a^A)K] = p.$$

It is easy to verify from equations (10) and (11) that because $p^A(a^F) < p$, it must be that $a^A < a^F$. Also note that generally, a^A does not maximize the autarkic utility level $U(X(a,K), M(a,K))$.

Collecting our results, we have:

Proposition 2:

- a) A subsidy to the export sector increases the credit ceiling and the maximum credit ceiling is bounded by $D^{MAX}(1,p)$.
- b) A subsidy to the import competing sector reduces the maximum future repayment which is zero at $a=a^A$.

III.2 Optimal trade and debt policies.

The country can thus, by changing the private incentive for investment in the two sectors either (i) increase its borrowing above its normal credit ceiling by precommitting itself to larger future repayment or (ii) reduce its future repayment by essentially producing a production mix that fits its consumption preferences

better. In both situations, the country trades off productive efficiency losses with gains on the debt front. The preferred strategy will generally depend on the country's stock of inherited debt D_0 , on the expected terms of trade, on the marginal productivity of capital in $t=1$ and on the world's interest rate R^F . Intuitively, the larger the inherited debt, the more is the country interested in IS as a means of reducing future debt service; this tendency is reinforced if the marginal return on capital (and thus on new borrowing) is low either because of the exhaustion of profitable projects or because of low terms of trade. Finally, the higher R^F , the less is it interesting to borrow and the more is it profitable to try to reduce future repayments. We now make those claims more precise.

III.2.a The planner's program.

Formally, the problem of the social planner is to choose the size of the new loan D_1^* and an investment mix a^* that solves:

$$\text{Max } V(I-R, p) \quad \text{under the constraint in (9)}$$

Since p is exogenous the problem simplifies to a simple net income (NI) maximization problem by virtue of the separation principle:

- (12) Find (D_1^*, a^*) that maximize $NI = (I-R)$ subject to the constraint in (9).

III.2.b Solutions.

The optimal solutions to the program in (12) depend on the level of the exogenous variables as well as on the functional forms of the utility and production functions. It is useful to classify them according to whether the credit ceiling is, or is not binding when there is no trade policy, i.e. when $a=a^F$.

$$(i) \quad D^*(a^F, p) < D^{MAX}(a^F, p) :$$

When the credit constraint is not binding at $a=a^F$, investment is not constrained by liquidity considerations. In that case, no trade policy must be a local optimum, that is, $a^*=a^F$ must be a local extremum. To see why, we show that a marginal movement of (a) on either side of a^F will reduce net income. Figure 3 illustrates that case.

At the margin, favoring either the export or the IS sectors will respectively increase or reduce the credit ceiling but would leave the optimal borrowing below the credit ceiling and the debt repayment equal to its contractual value. Therefore, the only effect of a marginal trade policy is to generate inefficiencies in production and thus, net income will fall. This extremum $[D_1^* < D_1^{MAX} ; a^*=a^F]$ at point A_3 can arise when investment is not very profitable at the margin, when the interest rate R^F is large, when the stock of domestic capital K^D is large, and when inherited debt is low.

Although a no trade policy is in that case a local extremum, there can also exist another extremum with trade policy and a binding

credit ceiling. This extrema cannot involve EP [$a > a^F$] but could possibly involve an IS policy [$a < a^F$]. To see that, consider first a finite and positive movement of (a) away from a^F (EP). With no increase in borrowing, the export sector expands and its marginal productivity falls below R^F , and the import sector shrinks with its marginal productivity above R^F . The credit ceiling also expands and new borrowings can be used to bring back the import sector to its original size with its marginal productivity of capital equal to the interest rate R^F . But at this point, the export sector is producing inefficiently and is making a loss given the cost of capital. Thus, this type of policy cannot increase net income.

However, another extremum with IS might exist. This is because with enough IS [(a) small enough and below a^F], the credit ceiling falls below the inherited debt D_0 (at point C_3). The movement in (a) that is required to reach that ceiling, and thus, the amount of production inefficiencies required, depends principally on the amount of inherited debt. From this point on, as (a) decreases, the debt repayment goes down. At the margin, the productivity of a dollar of capital in the export sector is above R^F while it is less than R^F in the import sector. A local extremum will exist (at point G_3) if at some (a), the total reduction in the repayment is large enough to offset the loss in the import sector and the opportunity loss in the export sector. Otherwise, the net income function is represented at the left of C_3 by the branch C_3E .

Moreover, this extremum could produce an overall net income above the no trade policy case when $D^1 \cdot (a^F, p)$ is small. For example,

ii' it is locally optimal not to take any new loan in $t=1$ without trade policy, if inherited debt is large and close to the no trade policy credit ceiling, and if production distortions have a small inefficiency cost but a large effect on the gains from trade, then an import substitution extremum will exist and it will dominate the free trade extremum.

[figure 3]

$$(ii) \quad D^*(a^F, p) = D^{\text{MAX}}(a^F, p) :$$

If the credit ceiling is binding when there is no trade policy, the marginal return of capital is above the cost of capital in both sectors: investment is thus liquidity constrained. In this case, no trade policy cannot be an optimal strategy, i.e a^* is necessarily different from a^F . To see that, we need to consider the two possible cases of a binding credit ceiling with no trade policy: either the credit ceiling is below the inherited debt and there is some new lending, or it is below D_0 and there is no new lending.

In the first case [$D_0 > D^{\text{MAX}}(a^F, p) = D^*(a^F, p)$] illustrated in figure 4, income can be increased with a marginal policy of EP. This is because such a marginal move will increase the credit ceiling and thus, it will trade off inefficiency losses (close to zero at a^F) for a gain in the scale of production (larger than zero with a binding ceiling). Thus, the slope of the net income function at point A_4 is positive. Net income must reach a maximum at some (a) satisfying $a^F < a < 1$ (as in point B_4) because of decreasing return in production.

Moreover, there can exist another extremum involving IS. This is because a large enough shift in (a) below a^F reduces the credit ceiling to a level below the inherited debt (at point C_4). From that point on, a further reduction in (a) reduces both the debt repayment and productive efficiency. Income increases when the first effect dominates, and an extremum involving IS will then exist (G_4 on the branch C_4D). Otherwise, there is no such extremum (branch C_4E).

In the second case [$D_0 < D^{\text{MAX}}(a^F, p) = D^*(a^F, p)$] depicted in figure 5, a marginal policy of IS will increase income because it trades off some inefficiencies in production (close to zero at a^F) for a reduction in the credit ceiling further below D_0 , thus leading to a fall in the debt repayment. Therefore, the slope of the net income function at point A_5 is negative. An extremum at some (a) satisfying $a^A < a < a^F$ will necessarily exist (as at point B_5). Moreover, another extremum involving EP might also exist. A large enough shift in (a) above a^F will increase the credit ceiling sufficiently to make new loans possible (at point C_5). From that point on, as (a) increases, new lending as well as productive inefficiencies increase. When the first effect dominates, an extremum involving EP will exist (on the branch C_5D). Collecting the results, we have:

Proposition 3: Local and global optima

- a) When investment is not liquidity constrained at a^F , either (i) $a^* = a^F$ (no trade policy) or (ii) $a^* < a^F$ with $D_1^* = 0$ (IS with no new borrowing), or both.
- b) When investment is liquidity constrained at a_F , the optimal trade and debt strategy is either (i) $a^* > a^F$ and $D_1^* > 0$ (EP with

positive new borrowing) or (ii) $a^* < a^F$ and $D_1^* = 0$ (IS with no new borrowing), or both.

c) In both (a) and (b), the global optimum can be either of the two extrema, depending on the size of the inherited debt, the relative intensity of capital in the two productions functions and the relative intensity of the gains from trade in the two goods.

[figures 4 and 5]

III.2.c Comparative statics.

Finally, we do some comparative statics and show that exogenous shocks (changes in D_0 , R^F , p) can produce a change in the optimal regime, i.e a continuous change in any one of the exogenous variables can produce a large and discontinuous change in a^* . In effect, the local extrema are affected and the global maximum can shift from one of the possible extrema to another.

(i) Changes in D_0 and in R^F :

Proposition 4:

When no trade policy is optimal, a large enough increase in $D_0 R^F$ makes EP become globally optimal. With further increases in $D_0 R^F$, a fix level of IS becomes globally optimal.

To see what is going on, consider the effect of a marginal increase in $D_0 R^F$ on net income in each of the three possible extrema.

In all cases, we know that the ceiling on new borrowings D_1^{MAX} decreases:

(i) If the credit ceiling is not binding and thus, $a^* = a^F$, NI decreases as debt and its burden increase. Moreover, the credit ceiling D_1^{MAX} is decreasing and at some $D_0 R^F$, it catches up with D_1^* . At that point, investment becomes liquidity constrained and this optimum disappears and is replaced with an optimum involving EP (since at this point, a marginal increase in (a) above a^F is costless in terms of efficiency but increases the ceiling).

(ii) If the credit ceiling is binding with $D_1^* > 0$, we know that $a^* > a^F$ (i.e., EP is optimal). NI decreases on two accounts: the debt burden increases and the debt ceiling as well as the size of the new borrowings decreases. (Moreover, new loans are more expensive in the case of a rise in R^F). The country reacts by altering its optimal a^* . When the production functions are concave enough, the loss of liquidity is very costly and the country reacts by increasing a^* in an attempt to reduce the fall in D_1^* . At some point, the increase in $D_0 R^F$ and the decrease in NI are so large that the global optimum shifts to an IS strategy.

(iii) If the credit ceiling is binding with $D_1^* = 0$, we know that $a^* < a^F$ (i.e., IS is optimal). There is no new borrowing and the repayment is given by the gains from trade $B(\cdot)$. An increase in $D_0 R^F$ has therefore no effect on NI and on a^* . This also explains why the EP strategy (that yields a NI that is decreasing in $D_0 R^F$) will necessarily get dominated by an IS strategy for a large enough fall in $D_0 R^F$.

(ii) Changes in p , the terms of trade.

Proposition 5:

For a large enough p , free trade is optimal. For a large enough reductions in p , EP becomes globally optimal. A further large enough reduction in p makes IS globally optimal.

Terms of trade changes are slightly more difficult to analyze because they affect both the credit ceiling (Proposition 1) and the free trade optimal investment mix a^F . Therefore, the three possible extrema are affected. Consider the effect on each extrema of a deterioration in p :

(i) For p large enough, the gains from trade are so large that the credit ceiling exceeds inherited debt plus the demanded new loans. In that case, there is no need to distort investment and free trade is optimal. As p decreases, investment is shifted from the export to the import sector and NI falls. The fall in the credit ceiling $B(a,p)$ is due to the reduction in both the terms of trade and of a^F . When the credit ceiling becomes binding¹⁶, the free trade extremum disappears and is replaced by an extremum involving EP as the country attempts to increase its borrowings.

(ii) When EP is optimal. A fall in p reduces new borrowings and the marginal productivity of the export sector. Thus, NI falls on both

¹⁶ This assumes that the demand for capital falls less than the ceiling. Otherwise, the economy is stuck to this extremum until a jump to the IS extremum becomes profitable.

accounts. If the credit ceiling remains binding, the EP effort is reduced because the marginal distortion becomes more costly. A large enough fall in p induces then a shift in the optimal regime to IS.¹⁷

(iii) When IS is optimal. A fall in p reduces the gains from trade and thus the debt repayment and NI increases on this account.

However, NI is reduced by the direct effect. Overall, NI goes down but the optimal (a) is not affected. Moreover, the reduction in NI is less marked than in the EP case. Thus, and starting with an EP strategy, IS becomes optimal for a large enough fall in p .

IV. Extensions of the model.

Admittedly, the model presented above is a highly stylized simplification of a complex world. In this section, we discuss how our results are affected if some of the assumptions are released.

IV.1 Endogenous savings.

How would domestic savings be determined by a planner if he controlled them in addition to his controlling (a) and D^1 . In order to answer that, we need to analyze the effect of an increase in domestic capital K^D on the gains from trade B and on the credit ceiling D^{MAX} . In general, it is possible to show that $B(.)$ is increasing (concave) in K^D . This imply that in general, the planner can increase social welfare if he controlled domestic savings in

¹⁷ However, if the credit ceiling is not binding anymore because of a more pronounced fall in the demand for capital, a^* becomes optimal before a further reduction in p makes IS globally optimal.

addition to the investment mix. In particular, when the optimal strategy is to reduce the debt repayment (IS), the use of two control variables (savings and the investment mix) allows the planner to get the same debt repayment (gains from trade) with less inefficiencies in production (less IS) in exchange for some inefficiencies in the intertemporal allocation of resources. This is achieved by reducing (taxing) savings. However, when the optimal policy is to increase the credit ceiling (EP), an increase in savings can help. Finally, if the optimal policy is no intervention, there is no reason to subsidize or tax saving.

Those results somehow confirm the predictions of single good models of the debt overhang. In those models, a reduction in savings reduces the debt repayment because they reduce future output. In our model, a debt overhang can lead to attempts to reduce the repayment. In that case, an IS policy and a decrease in saving from the laissez-faire allocation increases welfare.

Proposition 6: In general, it is optimal to tax savings when IS is globally optimal and to subsidize them when EP is globally optimal.

IV.2 Bargaining.

If $B^U < B < 0$, the question is whether B is a stable function of B^L . The bargaining literature has not yet resolved this issue in general circumstances. However, the Nash bargaining solution and its Rubinstein interpretation, give rise to payoff functions that are

linear in the threat points. Since $(I-B^U)$ can be interpreted as the threat point of the creditors, B is indeed linear in B^U in that case.

IV.3 Commitment and investment reversals.

If there are no costs for reversing investment, commitments to increase export in the future in exchange for new loans today will not be credible. Instead, creditors can rationally expect countries to do what is in their ex-post interest and in particular, to avoid distorting investment once the loans have been disbursed. Moreover, IS strategies will be expected to be used to reduce repayments. These considerations explain the difficulty of using EP strategies when it is in the ex-ante interest of countries to do so. In the absence of a commitment mechanism, EP strategies can be made credible and thus used when investment reversals are costly and when a country succeeds over time in developing a credible reputation. In general, this adds to the costs involved in attempts to regain credit-worthiness. Multilateral institutions can help in the resolution of this time inconsistency problem by lending on a conditional basis and by developing a close relation with domestic policy-makers. In general, their involvement can signal that the country is trying to regain credit-worthiness.

V. Welfare considerations.

V.1 Creditors optimal strategies.

When inherited debt is so large that it is optimal for a country to follow an IS strategy, the creditors strategy of holding on to

their claims in not optimal. Instead, their attempts to collect a large debt leads to the provision of incentives in the debtor country for inefficient investment and saving behaviors and thus to smaller repayments. In a world of certainty, a large enough reduction in D_0 in the form of a debt write-off will induce in the debtor country a more efficient production structure as well as a larger debt repayment. In a world of uncertainty, contingent debt relief will also achieve this aim. However, creditors may be unwilling to grant uncontingent debt relief in view of the possibilities of good shocks in the future that will increase the credit ceiling sufficiently to make an IS strategy sub-optimal for the debtor¹⁸. If this view is accepted, a resolution of the debt crisis presupposes more complex financial recontracting than that observed today.

Proposition 7: When IS is globally optimal, it is in the interest of creditors to grant debt relief.

V.2 World efficiency considerations.

In the case of a small debtor trading with a large creditor, the interest of the creditor country is the same as that of the creditor banks. If the creditor group is not coordinated enough to give relief when it is profitable to the group, there is room for policy intervention. The problem is that the possibility of intervention can make it strategically superior for the creditor group to hold out on

¹⁸ For a discussion of other reasons why creditors do not give relief, see Feldstein and al (1987)

debt relief in an attempt to extract some bribe from their government, at least in the bad states of nature. In this event, a binding commitment not to interfere might give the creditors group a stronger interest in granting relief. Regulatory changes can also help (as those that encourage small banks to pull out).

But there are other reasons why governments may want to interfere and those are essentially trade reasons. Even with small countries, the creditors government policy stand towards the debt crisis matters in terms of trade because as a group, the debtors form a large trading bloc. Creditors governments might have an interest in intervention either to encourage trade (acting in the interests of consumers, export producers or of efficiency) or to discourage trade (to protect import competing sectors). They can achieve the first goal by various means including a debt facility or by an indirect involvement through conditional lending by the multilateral organizations. They can achieve the second goal by doing nothing and letting the crisis deteriorate (or even put pressure on the banks so that they do not give relief).

V. Concluding remarks.

We have argued that for countries with a binding credit ceiling, a policy of trade intervention necessarily increases welfare. The choice between EP and IS depends on whether it is more profitable to try to increase the credit ceiling in order to borrow more, or to reduce the credit ceiling below inherited debt in order to repay

less. The important determinants of this choice of a joint trade and debt strategy are the stock of inherited foreign debt, the level of the world interest rate, and the terms of trade. Generally, EP is more profitable with a low inherited debt, a low interest rate and high terms of trade. As these variables deteriorate, the optimal strategy can jump to IS. Thus, a Korea could suddenly turn into a Peru. In this case, it is optimal for the creditors coalition to grant debt relief.

Appendix of proofs.

1. The model.

The country's objective is to choose (a^*, D_1^*) that maximize net income $(I-R)$ with

$$(4) \quad I(K, a, p) = pX + M$$

$$(1) \quad X(K, a) = f(aK) \quad \text{with } f' > 0 \quad \text{and} \quad f'' < 0$$

$$(2) \quad M(K, a) = g((1-a)K) \quad \text{with } g' > 0 \quad \text{and} \quad g'' < 0$$

$$(3) \quad K = K^D + D_1$$

$$(6) \quad R = \min[B, D_2]$$

$$(5) \quad D_2 = (D_0 + D_1)R$$

$$(9) \quad D_1 < D_1^{\text{MAX}} = \text{Max}(D^{\text{MAX}} - D_0, 0)$$

$$(8) \quad D^{\text{MAX}}(K^D, a, p) = B^{\text{MAX}}(K^D, a, p)/R_F = B(K^D + D_1^{\text{MAX}}, a, p)/R^F$$

$$(7) \quad B(K, a, p) = I - E[U(X, Y), p]$$

2. Credit ceiling.

2.a. Existence. The credit ceiling D^{MAX} is defined in equation (8) and exists whenever that equation has a solution. Using (7), we have to show that:

$$(A1) \quad \exists D^{\text{MAX}} \text{ s.t. } D^{\text{MAX}} R^F = I(K^D + D_1^{\text{MAX}}, a, p) - E(U^A, p)$$

for all $a \in [0, 1]$ and $p > p^A$

with $U^A = U[X(a, K^D + D_1^{\text{MAX}}), M(a, K^D + D_1^{\text{MAX}})]$

When D_0 is very large, $D_1^{\text{MAX}} = 0$ and $D^{\text{MAX}} = B(K^D, a, p)$ which is bounded. On the other hand, when $D_0 = 0$, $D^{\text{MAX}} = D_1^{\text{MAX}}$, and it is possible to show that

a fix point D_1^{MAX} that solves (A1) exists: since the LHS of the equation increases in D_1 at the rate of R^F , a sufficient condition for the existence of a fixed point is that the RHS (i) be positive at $D_1=0$ and (ii) concave in D_1 . (see figure 1)

(i) for all $D_1 > 0$, $B > 0$ when $p > p^A$ since $V^T(D=0) > U^A(D=0)^{19}$ implying that the expenditure needed to reach U^A at price p is lower than I , the income under the trade regime.

(ii) Concavity of B : differentiating (7) with respect to D_1 , and using the fact that, because of the price normalization, the marginal utility of the second good U_M is equal to the marginal utility of income, we get:

$$\begin{aligned} (A2) \quad \partial B / \partial D_1 &= apf' + (1-a)g' - (\partial E / \partial U^A) [U_X f' a + U_M g' (1-a)] \\ &= apf' + (1-a)g' - [p^A f' a + g' (1-a)] \\ &= (p - p^A) f' a > 0 \end{aligned}$$

$$(A3) \quad \partial^2 B / \partial D_1^2 = a(p - p^A) f'' - (\partial p^A / \partial D_1)$$

which is negative when the second term on the RHS is either negative, or positive and small enough. To see when that occurs, consider:

$$(A4) \quad \partial p^A / \partial D_1 = (\partial p^A / \partial I^A) (\partial I^A / \partial D_1)$$

where I^A is income evaluated at the autarkic price p^A . The expression in (A4) is zero with homothetic preferences. It is negative when the

¹⁹ where V^T is the indirect utility function under the trade mode.

first good becomes relatively less desirable with higher income.

2.b. Comparative statics.

In all cases, we focus on the move of the function $B(\cdot)$ in (7). (A1) insures that D^{MAX} moves in the same direction (also, see figure 1).

$$\begin{aligned} \text{(A5)} \quad \partial B / \partial a &= pf'K - g'K - (\partial E / \partial U^A) [U_X f'K - U_M g'K] \\ &= pf'K - g'K - [p^A f'K - g'K] \\ &= (p - p^A) f'K > 0 \end{aligned}$$

$$\text{(A6)} \quad \partial^2 B / \partial a^2 = (p - p^A) K^2 f'' - (\partial p^A / \partial I^A) (\partial I^A / \partial a) f'K < 0 \quad \text{with homothetic preferences.}$$

$$\text{(A7)} \quad \partial B / \partial p = X - (\partial E / \partial p) = X - x > 0 \quad \text{since } X \text{ is exported}$$

$$\text{(A8)} \quad \partial^2 B / \partial p^2 = -\partial x / \partial p > 0$$

$$\text{(A9)} \quad \partial D^{\text{MAX}} / \partial R^F = -B / (R^F)^2 < 0$$

$$\text{(A10)} \quad \partial B / \partial K^D = \partial B / \partial D > 0$$

3. Choice of the optimal investment mix (a).

3.a. Determination of a^A :

a^A minimizes B in (7). Using (A5), the first order condition is given by $p^A = p$. An interior solution is guaranteed by the convexity of the indifference curves. At $a = a^A$, equation (7) implies that $B(a^A, p, K) = 0$ for all p and K because $U^A(a^A) = U^T(a^A)$.

3.b. Determination of a^F : See section II.5 and equation (10).

3.b. Local extrema.

The solutions (D_1^*, a^*) solve the first order conditions of the maximization of NI under (1) to (7). These are:

$$(A6) \quad \partial I / \partial D_1^* - R^F > 0 \quad \text{if } D_1^* = D_1^{\text{MAX}} \quad (\text{liquidity constrained solution})$$

$$= 0 \quad \text{otherwise} \quad (\text{liquidity unconstrained (LU)})$$

$$(A7) \quad \partial(I-R) / \partial a^* = 0$$

Proposition: Local extrema.

(1) In the liquidity unconstrained (LU) solution, $a^* = a^F$

(2) In the liquidity constrained solution, $a^* \neq a^F$. In particular:

$$a^A < a^* < a^F \quad \text{iff } D_1^{\text{MAX}} > 0 \quad (\text{EP strategy})$$

$$\text{and } a^F < a^* < 1 \quad \text{iff } D_1^{\text{MAX}} = 0 \quad (\text{IS strategy})$$

Proof. .

Using (6), and (8), rewrite (A7) as:

$$(A8) \quad \partial(I-R) / \partial a^* = (\partial I / \partial a^*) = 0 \quad \text{if LU}$$

$$(A9) \quad \partial(I-R) / \partial a^* = (\partial I / \partial a^*) + [(\partial I / \partial K) - R^F] (\partial D^{\text{MAX}} / \partial a) = 0 \quad \text{if } D_1^{\text{MAX}} > 0$$

$$(A10) \quad \partial(I-R) / \partial a^* = (\partial I / \partial a^*) - R^F (\partial D^{\text{MAX}} / \partial a) = 0 \quad \text{if } D_1^{\text{MAX}} = 0$$

In the liquidity unconstrained case, the FOC is given by (A8): a^* must maximize income and thus $a^* = a^F$. This proves (1). When the credit

ceiling is binding, either $D_1^{\text{MAX}} > 0$ or it is zero. In the first case, the FOC is given by (A9): the RHS term is positive by (A5) and (A6). Thus, the LHS must be negative, implying that a^* must be above a^F (EP strategy). In the second case, given by (A10), equation (A5) implies that the LHS must be positive at the optimum; thus, a^* must be below a^F (IS strategy).

3.d. Comparative statics: Changes in D_0

(i) LU and IS cases: from (A8) and (A10), it is easy to verify that $(\partial a^* / \partial D_0) = 0$. Moreover, $[\partial(I-R) / \partial D_0]$ is equal to $-R^F$ in the first case (since $R = D_0 R^F$) and to 0 in the second.

(ii) EP case: Using the envelop theorem and the fact that $R=B$, we have $[\partial(I-R) / \partial D_0] = -\partial I / \partial K < 0$. The sign of $(\partial a^* / \partial D_0)$ is indeterminate.

3.e. Comparative statics: Changes in p

(i) LU case: the envelop theorem implies that $\partial(I-R) / \partial p = X$

(ii) IS case: The envelop theorem imply that

$\partial(I-R) / \partial p = \partial I / \partial p - \partial B / \partial p = x > 0$. Moreover, the implicit function theorem and (A10) imply that

$$\text{sign}[\partial a^* / \partial p] = \text{sign}[\partial^2 I / \partial a \partial p - \partial^2 B / \partial a \partial p] = \text{sign}[f'K - f'K] = 0.$$

(iii) EP case: By the envelop theorem,

$$\partial(I-R) / \partial p = \partial I / \partial p + (\partial I / \partial K)(\partial D^{\text{MAX}} / \partial p) = x + (X-x)\partial I / \partial K > x \text{ using (A6).}$$

Moreover, the implicit function theorem applied on (A9) leads to:

$$\text{sign}(\partial a^* / \partial p) = \text{sign}[\partial^2 I / \partial a^* \partial p + \partial^2 D^{\text{MAX}} / \partial a \partial p (\partial I / \partial K - R^F) + \partial D^{\text{MAX}} \partial a^* . f'] > 0$$

Note that $(I-R)$ is affected more in the LI and EP cases than in the

IS case. Thus, a large enough drop in p leads to an IS global optimum.

3.f Comparative statics: changes in K^D

In all cases, the change in a^* is indeterminate and depends on the relative change in the marginal productivities of the two sectors.

Using the envelop theorem, we can show that:

(i) LU case: $\partial I - R / \partial K^D = \partial I / \partial K$

(ii) IS case: $\partial I - R / \partial K^D = \partial I / \partial K - \partial B / \partial K$

(iii) EP case: $\partial I - R / \partial K^D = \partial I / \partial K + [\partial I / \partial K - R^F] \partial D^{\text{MAX}} / \partial K^D$

It is easy to verify that net income is more affected in the EP case, followed by LU and IS. Thus, a large enough drop in K^D makes IS globally optimal.

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Table 1
Trade as a Percent of GDP 1978-87

	Exports of goods & s/o							Imports of goods & s/o							Trade Balance						
	Average 1978-81	1982	1983	1984	1985	1986	1987	Average 1978-81	1982	1983	1984	1985	1986	1987	Average 1978-81	1982	1983	1984	1985	1986	1987
Argentina	18.0	18.1	14.3	12.3	15.3	11.0	13.4	18.5	11.4	9.0	7.8	8.0	8.9	11.0	-0.5	4.7	5.4	4.7	7.2	2.1	2.4
Bolivia	31.0	22.0	29.0	27.4	15.1	18.8	14.2	35.0	21.9	24.0	22.2	14.8	20.6	18.1	-4.0	6.0	4.1	5.2	0.3	-4.6	-3.8
Brazil	8.4	8.2	11.6	13.0	12.2	9.0	8.7	10.0	9.2	9.5	8.4	7.5	8.7	8.4	-1.7	-1.0	2.0	5.4	4.8	2.3	2.4
Chile	19.2	19.1	23.4	23.4	27.9	29.9	28.4	25.0	20.8	20.3	23.9	24.5	25.4	23.9	-5.8	-1.6	2.9	-0.5	3.4	4.5	2.5
Colombia	14.0	11.3	9.8	13.6	13.6	19.4	19.1	15.5	17.2	14.9	14.0	14.8	15.1	15.5	-0.6	-4.8	-5.1	-0.4	-1.8	0.3	2.6
Costa Rica	29.8	42.8	34.0	34.0	32.0	32.5	34.0	38.3	40.0	36.5	34.2	33.5	31.4	34.5	-8.5	2.9	-0.5	0.7	-1.5	1.2	-0.6
Cote D'Ivoire	25.5	26.4	28.2	45.5	45.8	39.5	37.7	29.7	29.3	37.8	34.1	32.7	29.1	31.7	-4.0	-2.9	-1.7	11.5	13.2	19.4	8.0
Ecuador	23.2	21.5	25.0	26.8	26.3	22.5	17.9	25.5	23.4	17.2	20.1	17.3	19.4	19.5	-2.4	-1.9	7.8	8.4	8.0	3.1	-1.8
Jamaica	49.1	42.3	37.8	53.5	58.1	32.9	55.5	51.8	54.5	46.0	59.9	68.2	49.2	54.1	-2.5	-12.2	-8.4	-6.5	-10.2	3.7	1.4
Mexico	11.8	15.7	19.0	17.8	15.6	17.3	20.7	13.2	11.9	8.9	9.4	10.4	12.8	13.3	-1.4	3.8	10.2	8.2	5.2	4.6	7.4
Morocco	17.9	19.5	21.9	25.2	25.5	24.5	24.8	20.8	24.5	21.3	25.5	26.3	21.8	20.0	-12.9	-14.8	-9.4	-11.3	-10.1	-7.3	-5.2
Nigeria	28.0	15.1	13.4	15.4	16.8	13.8	31.7	25.8	23.3	17.2	13.4	13.0	16.0	28.1	0.5	-7.2	-3.8	2.0	2.9	-2.2	3.5
Peru	20.8	15.8	18.8	18.7	22.5	13.0	8.3	18.3	18.7	15.5	14.8	15.8	14.3	8.8	2.3	-2.9	0.2	3.8	5.9	-1.3	-0.4
Philippines	19.3	17.1	19.7	21.7	21.1	25.1	23.6	24.9	23.7	26.5	22.3	18.2	19.9	21.1	-5.4	-8.5	-5.8	-0.5	2.9	6.1	2.5
Uruguay	15.7	15.5	24.4	24.6	24.4	24.1	20.8	19.8	17.1	22.3	20.3	19.8	18.5	18.6	-4.1	-0.5	4.1	4.2	4.5	5.5	2.0
Venezuela	20.8	25.9	23.4	33.9	30.2	19.1	30.4	28.9	28.9	13.4	29.0	19.4	19.8	28.1	1.9	-3.1	10.0	14.0	10.9	-0.7	4.6
Yugoslavia	17.7	28.3	27.1	29.8	29.8	23.5	22.0	25.2	28.1	31.0	32.5	31.3	24.1	22.7	-7.5	-4.8	-3.8	-2.9	-1.7	-0.5	-0.7
Total	15.9	15.3	17.1	15.5	17.5	15.5	15.7	15.0	15.9	14.5	13.8	13.4	13.5	14.0	-2.0	-1.5	2.5	4.7	4.4	2.9	2.7

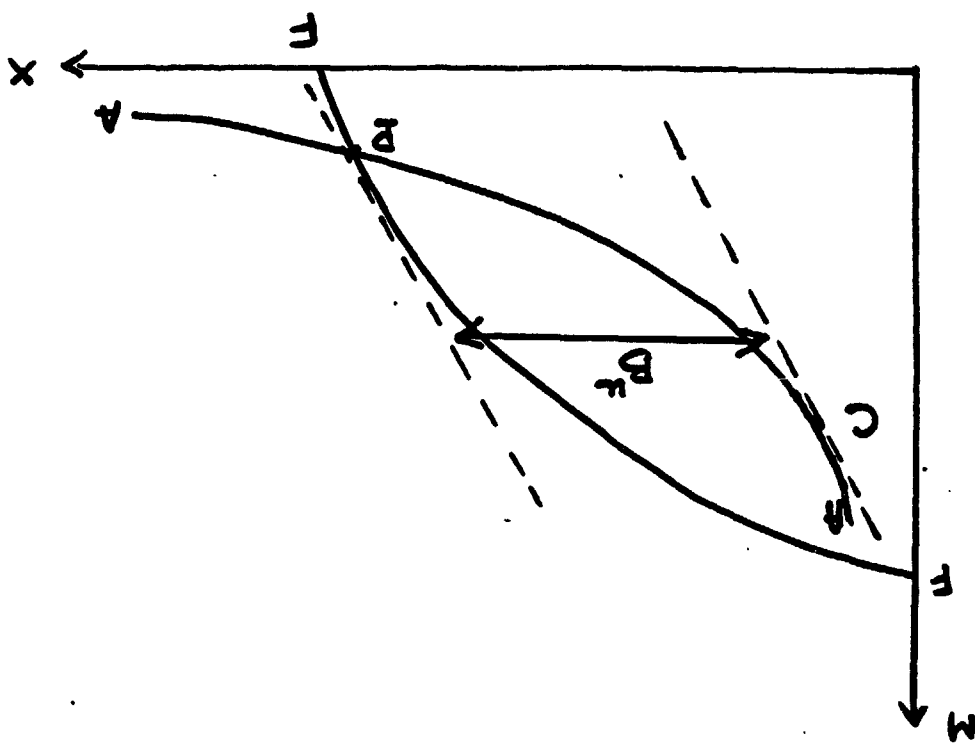
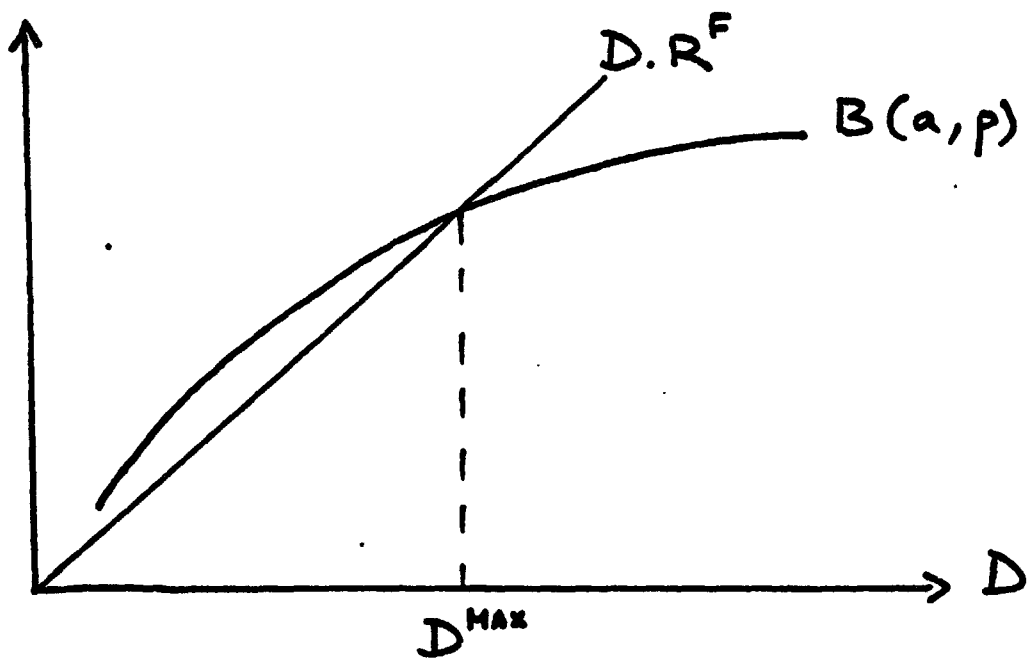
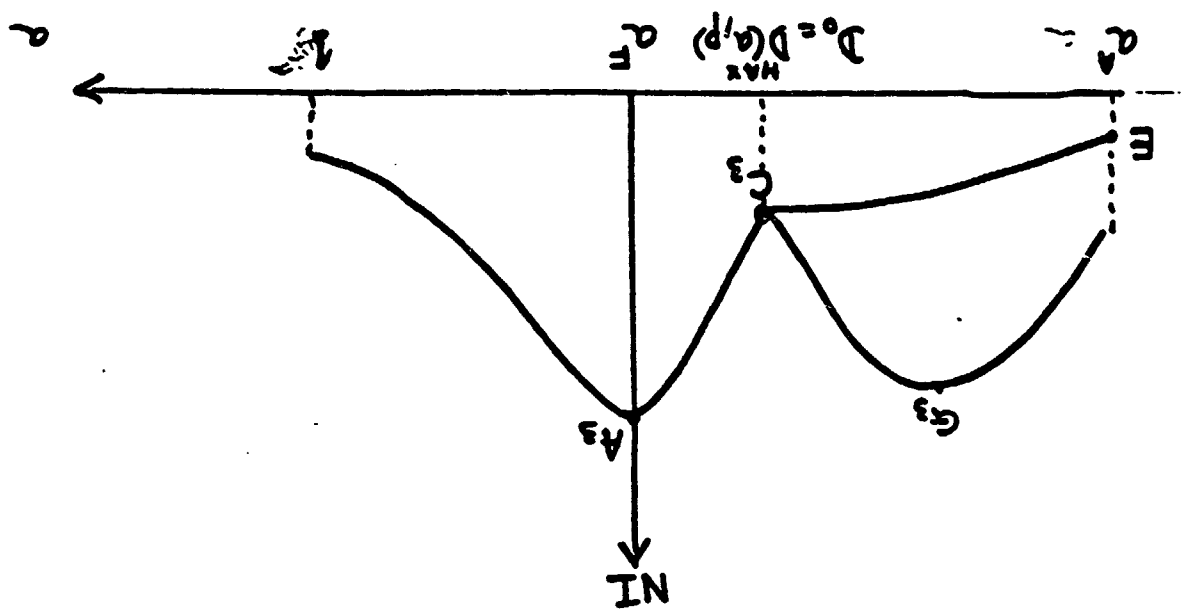


Figure 1. Determination of $\overline{B^0(k, a, p)}$

Figure 2 . Determination
of D^{MAX}

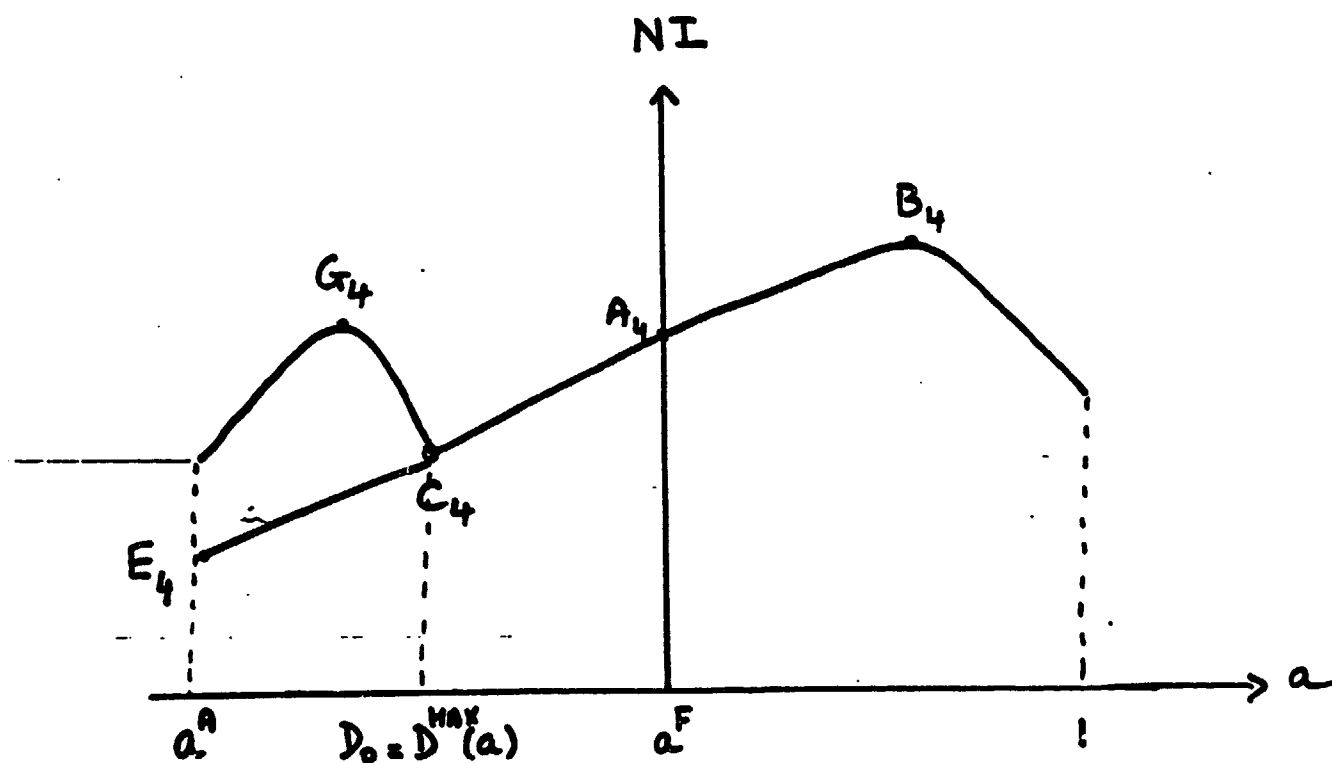




Import Substitution, Export Promotion

Figure 4

$NI(D_1^*, a)$ with $D_0 > D^{\text{MAX}}(a^F) = D^*(a^F)$

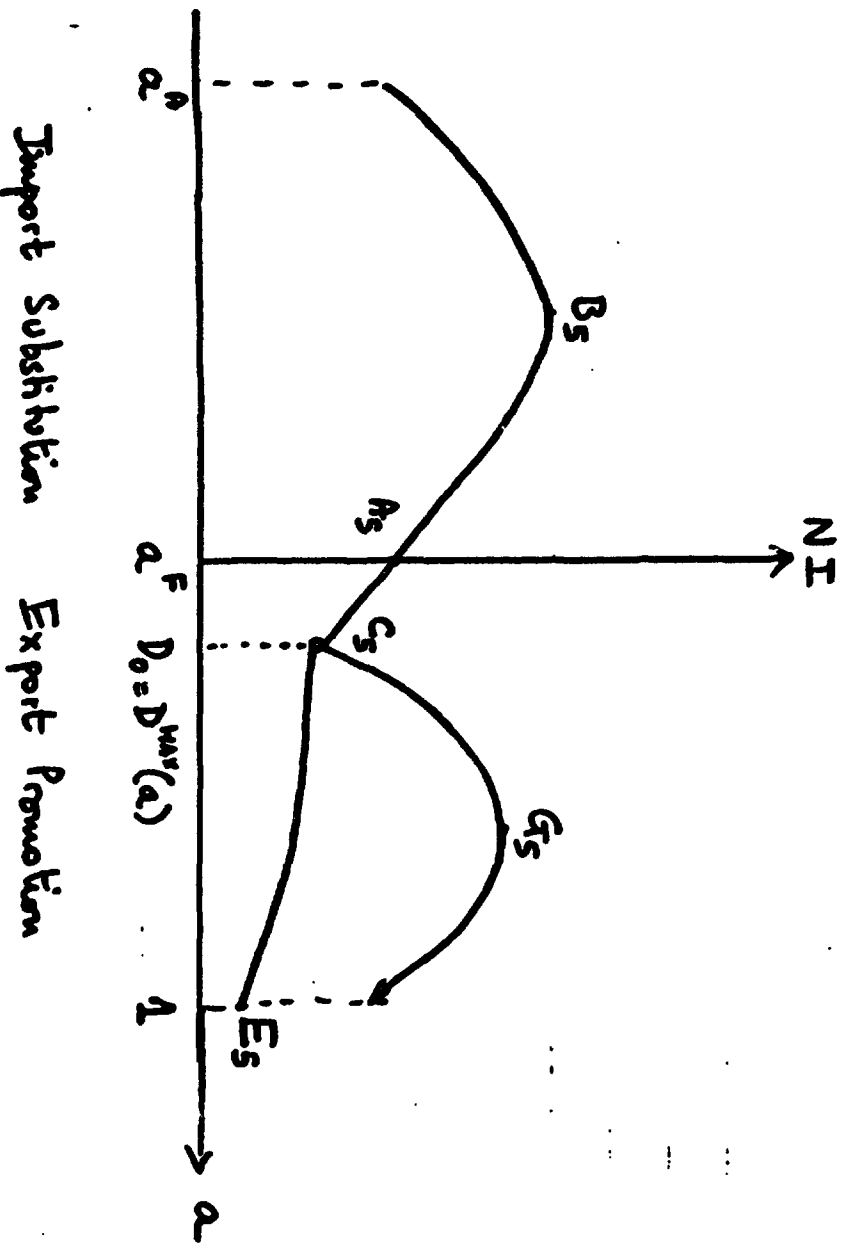


Import Substitution

Export Promotion

Figure 5

$NI(D^*, a)$ with $D_0 < D^{max}(a^F) = D^*(a^F)$



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